

WHAT IS CLAIMED IS:

1. A detector for providing position detection of a first kind together with position detection of a second kind the detector comprising:

a sensor,

a patterned arrangement of sensing conductors extending within said sensor, and

detection circuitry associated with said arrangement for detecting signals at same sensing conductors arising from said position detection of a first kind and signals arising from said position detection of a second kind, therefrom to detect positions at said sensor.

2. The detector of claim 1, wherein said position detection of a first kind comprises resonance-based object detection of an object able to produce an electromagnetic resonant field.

3. The detector of claim 1, wherein said position detection of a first kind comprises capacitive-based touch detection.

4. The detector of claim 1, wherein said position detection of a first kind comprises resonance-based object detection of an object able to produce an electromagnetic resonant field and said position detection of a second kind comprises capacitive-based touch detection.

5. The detector of claim 1, wherein said detection circuitry is capable of detecting interactions of said first kind and said interactions of said second kind simultaneously.

6. The detector of claim 1, wherein said detection circuitry is capable of detecting interactions of said first kind and said interactions of said second kind independently.

7. The detector of claim 3, wherein said sensor is located over a detection region, and comprises an oscillator for providing an oscillating signal, excitation circuitry for providing an excitation signal capable of exciting a resonant circuit of an electromagnetic stylus-type object, wherein said patterned arrangement comprises conductive elements extending over said detection region, and wherein said detection circuitry is adapted for detecting the capacitive effect of a conductive object, such as finger touch, and resonance from said electromagnetic stylus-type object at said at least one conductive element.

8. The detector of claim 7, wherein said oscillator is connected to provide said oscillating signal to said excitation circuitry and also to provide an excitation signal for said capacitive based touch detection.

9. The detector of claim 1, wherein said sensor is substantially transparent and suitable for location over a display screen.

10. The detector of claim 1, wherein said detection region is the surface of a display screen and wherein said sensor including said at least one conductive element is substantially transparent.

11. The detector of claim 1, comprising a plurality of conductive elements and wherein said detection circuitry comprises a differential detector arrangement associated with said sensing conductors for detecting differences between outputs of said conductors.

12. The detector of claim 7, wherein said sensing circuitry is configured for sensing a signal at said at least one sensing conductive element induced by a touch of a conductive object subjected to a transmission of said oscillated signal.

13. The detector of claim 7, wherein there is provided at least a second conductive element located within said sensor and having a junction with said one conductive element, wherein said oscillator is applied to one of said conductive

element and said junction is configured such that a touch by a capacitive body part causes an a.c short at said junction, said detector being configured to detect a resulting oscillating signal at said second conductive element and therefrom to infer said touch.

14. The detector of claim 13, wherein said detection circuitry is adapted to detect a signal at said at least second conductive element for interpretation as a number of touching objects.

15. The detector of claim 2, wherein multiple resonance-based objects can be detected based on the interpretation of properties of the detected signal.

16. The detector of claim 3, wherein multiple conductive objects can be detected based on the interpretation of properties of the detected signal.

17. The detector of claim 7, wherein said oscillator is connected to oscillate at least one of said detector, part of said detector and said at least one conductive element with respect to a reference voltage level, thereby to permit a capacitive current flow between a conductive touching object and said at least one conductor.

18. The detector of claim 1, wherein said sensor is configured with a transparent medium between itself and an underlying display screen.

19. The detector of claim 18, wherein said transparent medium comprises an air gap.

20. A detector for detecting touches by conductive objects making capacitive contact with a transparent sensor located over a display screen, the detector comprising:

a patterned arrangement of sensing conductors extending into said sensor, a source of oscillating electrical energy at a predetermined frequency, and detection circuitry for detecting a capacitive influence on said at least one sensing conductor when said oscillating electrical energy is applied.

21. The detector of claim 20, wherein said detection circuitry comprises a differential detector arrangement associated with said sensing conductors for detecting differences between outputs of said conductors.

22. The detector of claim 20, wherein said source of oscillating electrical energy is configured to transmit said energy into said conductive object, and said sensing circuitry is configured for sensing a signal at said at least one sensing conductive element induced by a touch of a conductive object subjected to said transmitted oscillated signal.

23. The detector of claim 20, configured to interpret a property of a signal detected at said at least one conductor in terms of a number of touching conductive objects.

24. The detector of claim 20, wherein there is provided at least a second conductor located within said sensor and having a junction with said at least one conductor, wherein said source of oscillating electrical energy is applied to one of said conductors and said junction is configured such that a touch by a conductive object causes an a.c short at said junction, said detector being configured to detect the oscillating signal at said second conductor as said capacitive effect and to infer said touch.

25. The detector of claim 24, wherein said detection circuitry is configured to interpret a property of a detected signal as a number of touches of a corresponding conductor.

26. The detector of claim 24, comprising a matrix of first sensors aligned in a first direction and second sensors aligned in a second direction with a plurality of junctions in between, and further comprising a tabulation of leakage capacitance values for each junction, said detector being configured to use said leakage capacitance values to correct readings at each conductor.

27. The detector of claim 20, wherein said source of oscillating electrical energy is connected to oscillate at least one of said detector, part of said detector and said at least one conductor with respect to a reference voltage level, thereby to permit a capacitive current flow between said conductive object and said at least one conductor.

28. The detector of claim 27, wherein said source of oscillating energy is connected to oscillate a first part of said detector, and wherein said first part is connected to a second part not subject to oscillations via a communication connection unaffected by the potential difference between said first and said second parts of the detector.

29. The detector of claim 28, wherein said communication connection comprises at least one differential amplifier.

30. The detector of claim 20, wherein said sensor is configured with a transparent medium between itself and said display screen.

31. The detector of claim 30, wherein said transparent medium comprises an air gap.

32. The detector of claim 20, wherein said sensor comprises a grid of conductors arranged within a layer thereof.

33. The detector of claim 32, wherein said conductors are connected pairwise to amplifiers.

34. The detector of claim 33, wherein said amplifiers are differential amplifiers each having a positive input and a negative input and wherein one conductor of said pair is connected to said positive input and a second conductor of said pair is connected to said negative input.

35. The detector of claim 27, further comprising a compensation table for providing a compensation value at each conductor to compensate for static noise.

36. The detector of claim 35, configured to update said compensation table upon system startup.

37. The detector of claim 35, configured to use an ambiguous object detection as a trigger to refresh said compensation table.

38. The detector of claim 37, wherein any combination of number, phase and position data from detected signals are used to define ambiguity in object detection.

39. A method of touch sensing at a matrix of sensing conductors located in a transparent sensor over an electronic display screen, comprising:

providing an oscillating signal at a predetermined frequency, and
measuring said conductors for capacitive effects on said conductors due to touch thereon.

40. The method of claim 39, comprising providing said oscillating signal to an external transmitter to energize a touching body part.

41. The method of claim 39, wherein said matrix comprises first conductors aligned in a first direction and second conductors aligned in a second direction, the method comprising providing said oscillating signal to said first conductors and sensing said oscillating signal at any of said second conductors to which said signal has been passed by a capacitive link caused by a touching conductive object.

42. The method of claim 39, comprising providing said oscillating signal to at least said conductors such that a conductive touching body drains current from a respective conductor.

43. The method of claim 42, comprising using said oscillating signal to oscillate a detection mechanism comprising said conductors wherein said oscillated detection mechanism is simultaneously isolated from common ground.

44. The method of claim 42, comprising:

using said oscillating signal to oscillate a first part of a detection mechanism,
said first part comprising said conductors,
isolating said first part from a second part, and
using said isolated second part to communicate touch detection outputs to
external devices.

45. A method of manufacture of a touch detector for an electronic display screen, comprising:

providing an oscillation signal source,
embedding a grid of transparent conductors within at least one transparent foil,
placing said transparent foil over said electronic display screen, and
providing detection circuitry for detecting capacitive effects on said conductors.

46. The method of claim 45, further comprising applying an excitation unit about said electronic screen for exciting an electromagnetic stylus, so that location of said stylus is detectable at said grid of transparent conductors.

47. Touch detection apparatus comprising:

a sensor comprising at least one sensing conductive element,
an oscillator for providing an oscillation signal,
a transmitter, associated with said oscillator, for transmitting said oscillation signal in the vicinity of said sensor,
sensing circuitry for sensing a signal at said at least one sensing conductive element induced by a touch of a conductive object subjected to said transmitted oscillated signal.

48. Touch detection apparatus comprising:

a sensor comprising a grid array of conductors in a first sense and conductors in a second sense and having junctions therebetween,

an oscillator for providing an oscillation signal to conductors in said first sense,

detection circuitry for detecting said oscillation signal when transferred via said junctions to conductors in said second sense, said transference being indicative of capacitive coupling induced by a touch of a conductive object touching said sensor at a respective junction.

49. Touch detection apparatus comprising:

a sensor comprising at least one sensing conductive element,

an oscillator for providing an oscillation signal, said oscillation signal being applied to at least part of said apparatus including said at least one sensing conductive element, and

detection circuitry for detecting a.c. grounding of said at least one sensing conductive element due to a capacitive connection to a conductive object touching said sensor.